Small Business Innovation Research/Small Business Tech Transfer

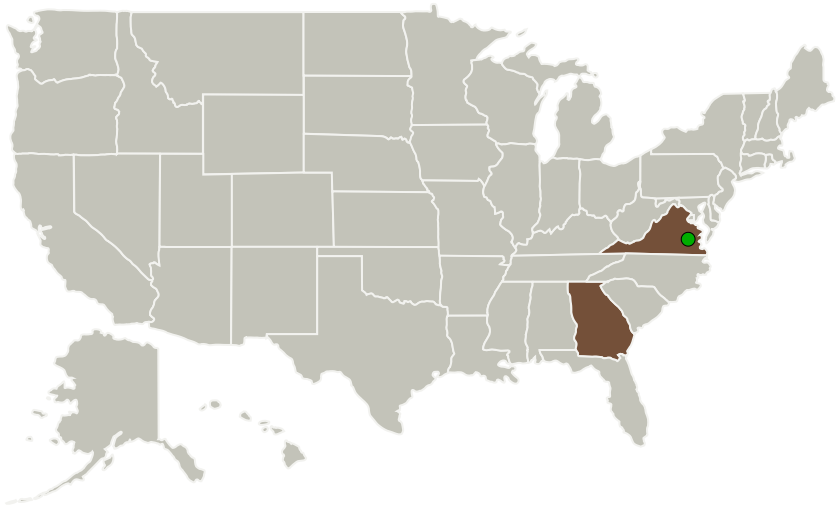
Fusion Enhanced Vehicle Level Diagnostic System, Phase I

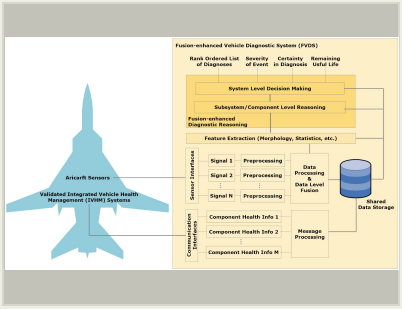
Completed Technology Project (2013 - 2013)

Project Introduction

Global Technology Connection, Inc. in conjunction with its partner, Vanderbilt University, is proposing to build a Fusion-enhanced Vehicle Diagnostics System (FVDS) framework to combine various information to help make go/no-go decisions from a safety point of view. Specifically single vehicle will be pursued by looking at each aircraft as a single entity. The system will ensure that the aircraft will make the next maintenance interval by catching errors in the shop and/or detecting emerging problems to maintain vehicle safety between major inspection intervals with an emphasis on the subsystems of airframe, avionics, and propulsion. The system will provide condition indicators, using model-based or data-driven approaches, from a subsystems' or components' point of view, and these will be fused, using the hybrid modeling based on Bayesian theory and/or graph theory, to provide overall safety from a system point of view. FVDS approach consists of a multi-level processing architecture that includes three levels of reasoners: 1. Individual Components and Line Replaceable Units that provide BIT test, sensor measurements and control commands to track the behavior of the particular component, and report faulty and abnormal conditions; 2. Subsystem reasoners to monitor the state of health of the airframe subsystem; and 3. System or Vehicle level reasoner to combine diagnostic and prognostic information from the individual subsystems, puts them on a time line, and also analyzes cascades of faults.

Primary U.S. Work Locations and Key Partners





Fusion Enhanced Vehicle Level Diagnostic System

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Organizations Performing Work	Role	Type	Location
Global Technology Connection Inc	Lead Organization	Industry Small Disadvantaged Business (SDB)	Atlanta, Georgia
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Georgia	Virginia

Project Transitions

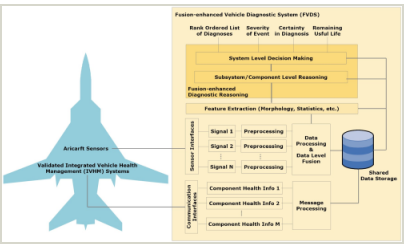
May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138180)*

Images



Project Image
Fusion Enhanced Vehicle Level Diagnostic System *(https://techport.nasa.gov/image/127522)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Global Technology Connection Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

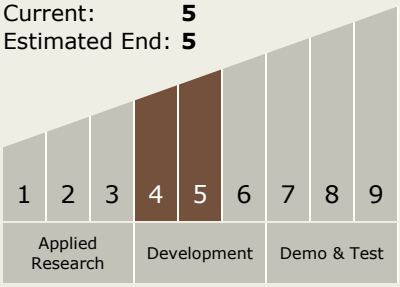
Carlos Torrez

Principal Investigator:

Seungkoo Lee

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.4 Information Processing
    - TX11.4.2 Intelligent Data Understanding

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System